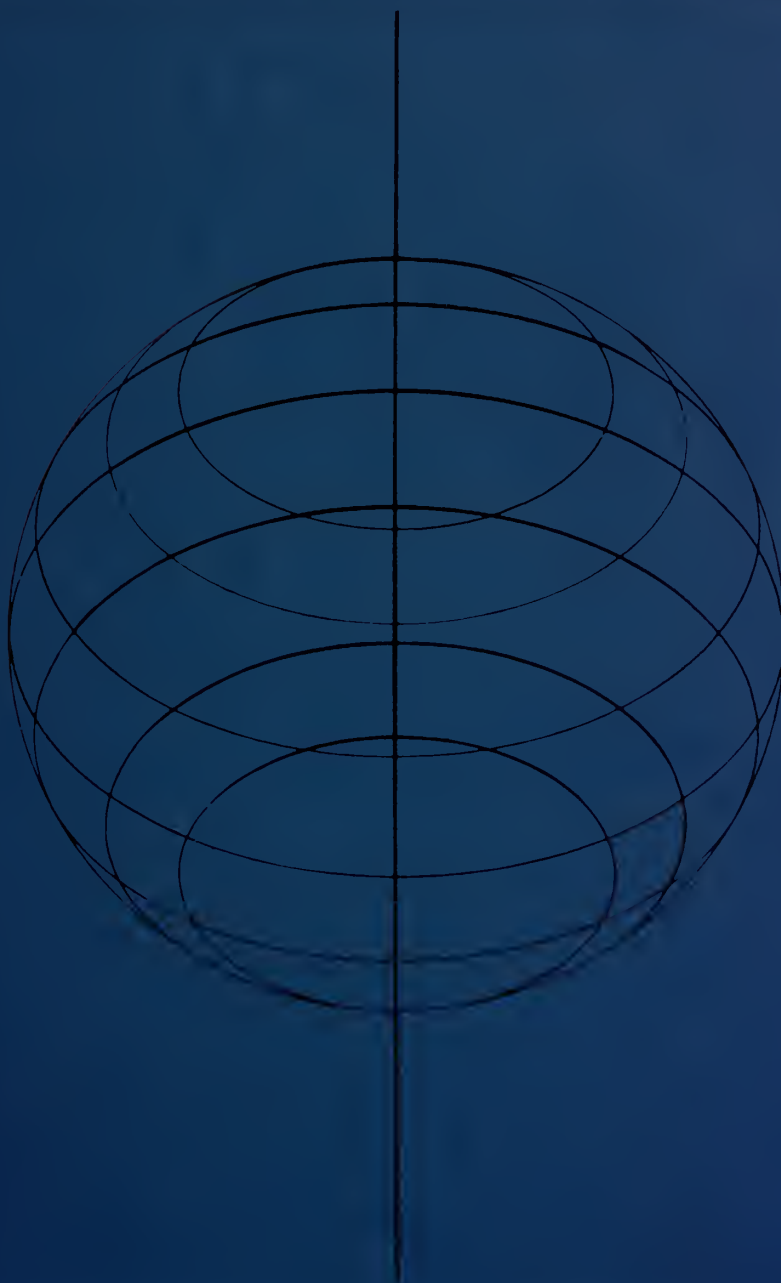


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NOAA Publications Announcement No. 71-3

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration



NOAA-71-3

NOV 1971

NOAA Publications Announcements include abstracts of all NOAA scientific and technical publications, NOAA contractor and grantee reports, outside publications, NOAA authors, translations of scientific and technical publications sponsored by NOAA under the P.L. 480 program or otherwise and publications of interagency, intergovernmental, and international organizations in which NOAA is officially represented or which may originate programs in which NOAA participates. Those serial data publications whose content is essentially repetitive in each issue, except for the time period for which the reported data apply, will be listed only once each year.

Publications are listed according to the following categories:

- 01 Atmospheric Science**
including Aeronomy, Meteorological observation, analysis and forecasting, Meteorological instruments, Physical and dynamic meteorology, Air quality and pollution, Weather modification, Climatology
- 02 Earth Sciences**
including Geodesy, Geomagnetism, Photogrammetry, Cartography, Seismology.
- 03 Environmental Systems**
including Data acquisition and communication systems, Environmental satellites
- 04 Hydrology and Limnology**
including River and flood forecasting, Precipitation, Snow, Evaporation, River and lake data and studies
- 05 Marine Biology and Fisheries**
including related aspects of food science and technology
- 06 Marine Geology and Geophysics**
including mining and mineral technology
- 07 Oceanography**
including Physical and Dynamic Oceanography, Air-sea interaction, Coastal studies, Oceanographic instruments
- 08 Physics**
including plasma physics, fluid mechanics and dynamics, and wave propagation
- 09 Miscellaneous**

Obtaining Copies of Publications—see inside back cover.

01 ATMOSPHERIC SCIENCE

71-03-01-01

Adams, Gene W. (NOAA, Research Laboratories and Department of Astro-Geophysics, University of Colorado). "Species Densities in the Lower Thermosphere Compatible With the U.S. Standard Atmosphere". NOAA, Environmental Research Laboratories, Space Disturbances Laboratory, Boulder, Colo. NOAA Technical Report ERL 193-SDL 20. Oct. 1970. 25 pp. #1 COM-71-50004 #2 \$0.30

O₂, N₂, and O number density profiles have been constructed in the 80-120 km region compatible with the U.S. Standard Atmosphere, 1962, and the U.S. Standard Atmosphere Supplements, 1966. Profiles have been constructed at 15, 30, 45, and 60°N, for winter, summer, and spring/fall. Descriptors: 1. Atmospheric density; 2. Earth atmosphere; 3. Atmospheric models; 4. Atmospheric pressure; 5. Diffusion; 6. Mixing; 7. Nitrogen; 8. Oxygen; 9. Thermosphere.

71-03-01-02

Bonner, William; Pyke, Charles; and Hickey, Richard. "A Study of the California Rainstorm of January 1969". University of California, Department of Meteorology, Los Angeles, Calif. NOAA, National Environmental Satellite Center, Washington, D.C. NOAA Contract E-3270(N) [NOAA Contract E-32-70(N)]. Final Report. Jan. 1971. 50 pp. #1 COM-71-00236

Unusually heavy rains occurred in southern California between 18 and 26 January 1969. This study examines the events that took place and the errors in the predictions. Rainfall occurred in connection with a large-scale blocking pattern in the eastern Pacific. Disturbances from middle latitudes move south of the block into subtropical regions, initiating strong convection within the moist tropical air. Failure to predict the onset of rain was associated with errors in numerical forecasts by the NMC primitive equation model. These errors probably arose from poor initial analyses which failed to identify a major disturbance as it moved into the long wave trough position in the southern branch of the current. Descriptors: 1. Rainfall intensity; 2. Weather forecasting; 3. Errors; 4. California; 5. Atmospheric disturbances; 6. Atmospheric models.

71-03-01-03

Doos, B. R. "Numerical Experimentation Related to GARP". International Council of Scientific Unions, World Meteorological Organization, Geneva, Switzerland. GARP Publication Series No. 6. Sept. 1970. 68 pp. Price \$4.00. WMO Publications Center, Division of UNIPUB, Inc. P.O. Box 433, New York, N.Y. 10016.

This publication contains a survey of the work on numerical experimentation related to the Global Atmospheric Research Programme, carried out by research groups in various countries. Following a classification introduced by the Joint Organizing Committee of GARP, the activities are grouped into the following problem areas; data requirements, observation systems, four-dimensional analysis, and forecasting. The international co-operation in numerical experimentation is discussed, and ways suggested for achieving effective co-operation. A catalog

01 ATMOSPHERIC SCIENCE (Cont.)

of 30 baroclinic weather prediction models, now being used or prepared by research groups in 12 different countries, is presented as Appendix I. Appendix II deals with a definition of statistical quantities and verification areas recommended for use in comparison studies of general circulation models. Descriptors: 1. Meteorological data; 2. Numerical models; 3. Numerical analysis; 4. Experimentation; 5. Weather forecasting; 6. Mathematical models; 7. GARP (Global Atmospheric Research Programme).

71-03-01-04

UDC 551.525.34:551.558.7

Dronia, Horst. "Urban Influence on Worldwide Temperature Trends". (Translation of "Der Stadteinfluss auf den weltweiten Temperaturtrend". Institute for Meteorology and Geophysics, Free University, Berlin, Meteorologische Abhandlungen, 74(4), 1967, 65 pp.). Agence Tunisienne de Public-Relations, Tunis. TT 71-55000. (Sponsored by the National Oceanic and Atmospheric Administration, U.S. Department of Commerce and the National Science Foundation, under Public Law 480. 1971. 98 pp.) (Copy available at NOAA, Atmospheric Sciences Library, Silver Spring, Md. Translation from copyright material. For internal use only. Not for publication.)

In this investigation an attempt has been made to exclude the warming influence of growing cities on long-period temperature trends of large areas of the world. The problem is handled in three different ways: 1. By comparison between uninfluenced exposures and city locations with long period records by computing the individual differences between these stations. 2. By dividing the global temperature trend into two individual series comprising stations situated in cities and in the open country respectively. The temperature trend of the curve representing the cities is warmer to the same degree that it reflects the mean effect of the growth of the cities. 3. By a computation of world-wide temperature trends since 1871/80 from uninfluenced stations (and a few reduced city stations) producing a temperature curve corresponding to those computed in 1. and 2. According to the above, the world temperature, after a short rise, has fallen about 0.1°C since 1871/80. Descriptors: 1. Temperature distribution; 2. Trends; 3. Urban areas; 4. Calculations; 5. Statistical analysis; 6. World-wide.

71-03-01-05

Eichelberger, Arthur L. (Weather Service Forecast Office, Los Angeles, Calif.). "Forecasting the Catalina Eddy". NOAA, National Weather Service, Western Region, Salt Lake City, Utah. NOAA Technical Memorandum NWSTM WR 62. Feb. 1971, 15 pp. #1 COM-71-00223

The Catalina Eddy, a small-scale vortex in the bight of southern California, has long been a serious problem for the forecaster. It disrupts the normal stratus pattern and can cause marked cooling in the southern California coastal area. The eddy is shown to result when an eastward-moving upper trough nears southern California, with strong northerly surface winds prevailing along the California coast. An objective aid for predicting the eddy is presented. It was found that with a surface pressure gradient of 5 to 10 millibars from

01 ATMOSPHERIC SCIENCE (Cont.)

35N 125W to Los Angeles, positive vorticity advection resulting in vorticity values of seven to ten units (10^{-5} Sec^{-1}) at Los Angeles will generate the eddy. Primitive equation prognostic vorticity charts are shown to be highly useful in forecasting development of the Catalina Eddy. Descriptors: 1. Weather forecasting; 2. Atmospheric circulation; 3. Sea breezes; 4. Meteorological charts; 5. Atmospheric disturbances; 6. California.

71-03-01-06

Goldstein, Melvin G. "Severe Storms". New York University, School of Engineering and Science, Dept. of Meteorology and Oceanography. NOAA, Environmental Research Laboratories, National Severe Storms Laboratory, Norman, Okla. NOAA Grant E22-101-70(G). Annual Report. Dec. 1970. 11 pp.

The role of jet streams in the development of severe storms was analyzed. Local variations of flow resulting from rapid changes of geostrophic velocity along the air trajectory or inertial instability can produce cold advection. The cold advection occurs in regions which frequently have severe storms. An analysis of the National Severe Storms Laboratory meso-network data for 1968 and 1969 was performed. Although inertial instability was present in the network, local deviations in wind direction and cold advection were not detected. Descriptors: 1. Severe storms; 2. Jet streams (meteorology); 3. Geostrophic wind; 4. Atmospheric circulation; 5. Wind velocity; 6. Advection; 7. Inertial instability; 8. Meso-network data.

71-03-01-07

Heck, Werner J. "Relationship of Wind Velocity and Stability to SO_2 Concentrations at Salt Lake City, Utah". NOAA, National Weather Service, Western Region, Salt Lake City, Utah. NOAA Technical Memorandum NWSTM WR 61. Jan. 1971. 21 pp. #1 COM-71-00232

This report presents a study of the relationship between wind velocities and SO_2 concentrations during late fall and winter, and a study of a high pollution episode for the relationship between day-to-day SO_2 concentrations and mixing depth. Descriptors: 1. Air pollution; 2. Industrial wastes; 3. Sulfur dioxide; 4. Utah; 5. Wind velocity.

71-03-01-08

UDC 551.465.7:551.511:519.24/.25(083.3)(083.9)

Horner, Theodore W. (Booz-Allen Applied Research., Washington, D.C.). "A Statistical Data Plan for BOMEX". NOAA, Environmental Research Laboratories, The BOMAP Office, Rockville, Md. NOAA Technical Memorandum ERL BOMAP-2. NOAA Contract E-192-69(N), Task 4. Dec. 1970. 116 pp. #1 COM-71-00188

The Barbados Oceanographic and Meteorological Experiment (Project BOMEX) was the first of a series of large-scale research projects planned by many nations throughout the world under the Global Atmospheric Research Project (GARP). The primary goal of the BOMEX project was to provide data for studying the sea-air interaction that drives atmospheric circulation

01 ATMOSPHERIC SCIENCE (Cont.)

circulation and global weather systems. The project was conducted from May through July of 1969 and produced substantial quantities of data that were recorded manually, on magnetic tapes, and on charts. The reduction of the raw data to a form useful for scientific investigation and for storage in scientific archives is the responsibility of the Barbados Oceanographic and Meteorological Analysis Project (BOMAP), a project established within the Research Laboratories of the Environmental Science Services Administration. Descriptors: 1. Atmospheric circulation; 2. Air-water interactions; 3. Field data; 4. Data reduction; 5. Data handling; 6. Mathematical models; 7. Equations of motion; 8. Statistical analysis.

71-03-01-09

Miller, Marvin E. (NOAA Climatologist for Ohio, Columbus, Ohio). "A Preliminary Climatology of Air Quality in Ohio". NOAA, National Weather Service, Eastern Region, Garden City, N.Y. NOAA Technical Memorandum NWS ER 39. Jan. 1971. 12 pp. #1 COM-71-00204

The report discusses (1) established standards for ambient air in Ohio and (2) observed trends in Ohio urban pollution levels for which standards have been set. To date, Ohio has established air quality standards for suspended particulates and sulphur dioxide. The data presented in this report indicate the trend within most Ohio urban areas since the early 1960's has been toward lower suspended particulate and dustfall loadings. Little can be said regarding the trends in sulphur dioxide levels because of relatively short periods of sampling. With the establishment of more ambient air quality standards, including standards for the oxides of nitrogen, increased sampling in time and space of all pollutants will follow. Such data will then provide the basis for a more comprehensive report on the "Climatology of Air Quality in Ohio." Descriptors: 1. Air pollution; 2. Environments; 3. Planning; 4. Atmospheric contamination control. 5. Forecasting; 6. Climatology; 7. Ohio.

71-03-01-10

UDC 551.511.3:551.465.71

Rasmusson, Eugene M. "Mass, Momentum, and Energy Budget Equations for BOMAP Computations". NOAA, Environmental Research Laboratories, The BOMAP Office, Rockville, Md. NOAA Technical Memorandum ERL BOMAP-3. Jan. 1971. 32 pp. #1 COM-71-00195

Atmospheric budget equations for mass, momentum, and energy are derived for an x, y, p^* coordinate system, where p^* is the pressure differential relative to sea level. These basic equations are then modified for use in computing the budgets of mass, momentum, and energy for the atmospheric part of the BOMEX volume, as related to the Barbados Oceanographic and Meteorological Experiment (BOMEX), May-July, 1969. Descriptors: 1. Atmospheric physics; 2. Air-water interactions; 3. Momentum transfer; 4. Equations of motion; 5. Earth hydrosphere; 6. Field data; 7. Data reduction; 8. Enthalpy.

01 ATMOSPHERIC SCIENCE (Cont.)

71-03-01-11

Sobel, Joseph P. "Objective Mesoscale Temperature Forecasts". Weather Bureau Eastern Region, Garden City, N.Y. ESSA Technical Memorandum WBTM ER 37. Sept. 1970. 27 pp. #1 COM-71-00074

Three sets of multiple regression equations were derived to forecast mesoscale temperature variations in the New York City Metropolitan Area (NYCMA). The first set contained only mesoscale predictors at each of six stations in the NYCMA, the second contained a simulated National Meteorological Center (NMC) forecast for La Guardia International Airport (LGA) as well as mesoscale predictors at each station, and the third contained the a priori observed temperatures at LGA and therefore consisted of no equations for LGA. In order to develop an operational set of equations, a fourth set was derived using the actual NMC forecasts for LGA as possible predictors. The resulting equations were able to improve upon the NMC forecast for LGA as well as produce temperature forecasts for the five network stations with at least as much skill as the original NMC forecast. Descriptors: 1. Temperature; 2. Atmospheric physics; 3. Regression analyses; 4. Weather forecasting.

71-03-01-12

UDC 551.501.81:656.7

Treussart, H. (Chairman, France); Bigler, S. G. (United States); Otani, K. (Japan); Kostarev, V. V. (U.S.S.R.); and Schwarz, R. (ICAO). (Working Group of the Commission for Instruments and Methods of Observations. "Use of Weather Radar for Aviation". World Meteorological Organization, Geneva. WMO Technical Note No. 110 - (WMO No. 264.TP.148). 1970. 72 pp. Price \$3.00. WMO Publications Center, Division of UNIPUB, Inc., P.O. Box 433, New York, N.Y. 10016.

For safe operation in all phases of flight there is a need for precise information on operationally significant weather. Weather radar has the capability of providing such information. This Technical Note contains a careful review of the requirements of aviation for weather radar, both ground-based and airborne, for the identification of hazardous meteorological conditions--thunderstorms, hail, and turbulence in particular. The performance characteristics of different types of radar with respect to identification and quantitative evaluation are discussed. The processing and transmission of radar data and development of new techniques are also covered. Descriptors: 1. Aircraft; 2. Radar equipment; 3. Meteorological radar; 4. Ground-based radar; 5. Radar detection; 6. Turbulence; 7. Hail; 8. Thunderstorms; 9. Aviation safety.

71-03-01-13

UDC 551.576.1:551.507.362.2(084.1)(213)"1967"

Wallace, J. M. "Time-Longitudinal Sections of Tropical Cloudiness (December 1966--November 1967)". University of Washington, Seattle, Department of Atmospheric Sciences. ESSA, National Environmental Satellite Center. ESSA Technical Report NESC 56. July 1970. 37 pp. ESSA Contract E-161-70(N). #1 COM-71-00131 #2 \$0.50

01 ATMOSPHERIC SCIENCE (Cont.)

Digitally processed mosaic strips of satellite photographs are presented in unique arrays. Time-longitude sections, each composed of zonal strips 5 degrees in width and containing a season of data, are presented for the year December 1966 through November 1967. Thirty-two of these sections show the tropical cloud systems around the world between 20°N and 20°S. This arrangement is convenient for the study of time variations of tropical cloud systems. Cloudiness frequently is observed to persist for many days within a zonal strip. Using the time-longitude sections presented, it has been possible in some cases to trace, from Africa to the western Pacific, the westward movement of cloud clusters identifiable throughout the period of travel. Descriptors: 1. Spaceborne photography; 2. Meteorological satellites; 3. Photographs; 4. Aerial photographs; 5. Cloud cover; 6. Clouds (meteorology); 7. Africa; 8. Pacific Ocean.

71-03-01-15

Ward, Neil B. "The Exploration of Certain Features of Tornado Dynamics Using a Laboratory Model". NOAA, Environmental Research Laboratories, National Severe Storms Laboratory, Norman, Okla. NOAA Technical Memorandum ERLTM-NSSL 52. Nov. 1970. 22 pp. #1 COM-71-00139 *2

Three characteristic features of tornadoes are simulated in a laboratory system, and the associated flow is observed and discussed. These are (1) a characteristic surface pressure profile, (2) a bulging deformation on the vortex core, and (3) multiple vortices in a single convergence system. Vortex motion is very sensitive to the geometrical features of the larger flow in which it is imbedded. Only when the diameter of the updraft column exceeds the depth of the inflow layer can features (1) and (3) be produced in the present model. When the updraft diameter is large compared to the depth of inflow, inertial effects associated with large changes in radial momentum produce significant convergent forces. When the updraft diameter is small compared to depth of inflow layer, the inflow speed is relatively small and related inertial effects are small. It is concluded that radial momentum flux is an important factor in the production of atmospheric vortices. Descriptors: 1. Atmospheric models; 2. Tornadoes; 3. Euler equation of motion; 4. Turbulent flow; 5. Vortices.

71-03-01-16

Wasserman, Stanley E., and Rosenblum, Harvey. "Use of Primitive Equation Model Output to Forecast Winter Precipitation in the Northeast Coastal Sections of the United States". NOAA, National Weather Service, Eastern Region, Garden City, N.Y. NOAA Technical Memorandum NWSTM ER 38. Dec. 1970. 22 pp. #1 COM-71-00138

The National Meteorological Center's Primitive Equation (PE) Model predictions of relative humidity and vertical velocity are found to be well correlated to relative frequency of observed precipitation in the Northeast Coastal section of the United States. A technique is presented for using

01 ATMOSPHERIC SCIENCE (Cont.)

these PE predictions to objectively forecast probability of precipitation in each of three consecutive 12-hour periods, the first period starting 12 hours after initial data time. Descriptors: 1. Numerical analysis; 2. Weather forecasting; 3. Precipitation (meteorology); 4. Winter.

71-03-01-17 UDC 551.509.323:551.524.36:551.509.313.001.57(781)Topeka
Webb, Morris S., Jr. (National Weather Service Office, Topeka, Kans.)1
"Forecasting Maximum and Minimum Surface Temperatures at Topeka, Kansas, Using Guidance From the PE Numerical Prediction Model (FOUS)". NOAA, National Weather Service, Central Region, Kansas City, Mo. NOAA Technical Memorandum NWSTM CR 37. Nov. 1970. 11 pp. #1 COM-71-00118

A system for predicting maximum and minimum surface temperatures is described. The technique, which utilizes computerized teletype forecast data (FOUS-1 and FOUS-2) as input, is described step-by-step. Minimum temperatures were more accurately forecast by this system than were maximum temperatures; this was due to systematic errors in the FOUS data. Descriptors: 1. Topeka, Kans. 2. Meteorology; 3. Atmospheric physics; 4. Temperature; 5. Weather forecasting; 6. Numerical analysis; 7. Wind (meteorology); 8. Clouds (meteorology); 9. Precipitation (meteorology).

71-03-01-18
Weedfall, Robert O. (NOAA, State Climatologist, Morgantown, W. Va.).
"How to Weather Your TV Weather Map". West Virginia Agriculture and Forestry, 3(4):4-7, Fall 1970. #1 COM-71-00151

A popularized article describing a method for interpreting television weather forecasts to make them more meaningful to the viewer. Four simple rules are set forth. The article applies to the West Virginia area. Descriptors: 1. West Virginia; 2. Weather forecasting; 3. Television systems.

71-03-01-19
Wendell, L. L. "A Preliminary Examination of Mesoscale Wind Fields and Transport Determined From a Network of Wind Towers". NOAA, Environmental Research Laboratories, Air Resources Laboratory, Silver Spring, Md. NOAA Technical Memorandum ERLTM-ARL 25. Nov. 1970. 303 pp. *2

Techniques have been developed to utilize wind data from a network of stations for the purpose of studying mesoscale flow patterns and transport. These techniques are suitable for operational use. Technical problems of data collection and reduction from this type of network are discussed. Hourly averaged wind data for the year 1969 from a network of 21 stations over the upper Snake River Plain of southeastern Idaho have been selected for examination. Six hourly wind field plots and computed trajectories of "particles" released once an hour are plotted for the entire data sample. Spatial variations in the flow patterns indicate that transport defined by a wind field is

01 ATMOSPHERIC SCIENCE (Cont.)

somewhat more reliable than transport defined by the wind at a single station applied over an area of more than a few miles. Descriptors: 1. Wind (meteorology); 2. Wind direction; 3. Windward drift; 4. Atmospheric circulation; 5. Data acquisition; 6. Data processing; 7. Mesoscale flow pattern.

71-03-01-20

White, Robert M. (Administrator, ESSA, U.S. Department of Commerce, Rockville, Md.). "Keynote Address: The Weather for Tomorrow". (In: American Meteorological Society, Boston, Mass. Joint Symposium Commemorating the Centennial of the United States Weather Services and the Golden Anniversary of the American Meteorological Society, Washington, D.C. Feb. 12-14, 1970. A Century of Weather Progress. James E. Caskey, Jr., (ed.). Boston, Mass. 1970. pp. 5-10.)

This address was given to commemorate a century of development of our weather services and the science of meteorology. At the same time initiating the celebration of the founding, 50 years ago, of the American Meteorological Society. This year also marked the 10th anniversary of the launching of the first weather satellite, so this period was blessed with an abundance of milestones. Descriptors: 1. Weather forecasting; 2. History; 3. Research. 4. World Weather Program.

71-03-01-21

UDC 551.588.1

Wilkins, Eugene M.; Sasaki, Yoshikazu; and Schauss, Roger H. (all, University of Oklahoma, Norman, Okla.). "Interactions Between the Velocity Fields of Successive Thermals". Monthly Weather Review, 99(3):215-226, Mar. 1971. #2 \$0.65.

Solitary thermals and continuous plume thermals both occur in nature, and the intermediate case of interacting successive thermals in a series may also be an important part of atmospheric convection. This analysis shows that residual updraft and vorticity concentration in the wake of a preceeding thermal can have important effects on its successor. A fluid mechanics model of buoyant clouds rising through a rotating medium is constructed for the purpose of predicting some of the sequential thermal effects that can be measured quantitatively for thermals simulated in the laboratory. The agreement with theory is satisfactory for the parameters that are subject to measurement, but some relevant constants can only be determined experimentally. For a situation in which a first thermal reacts strongly with the rotation field, it is shown that a succeeding thermal may receive a sizable enhancement of its vertical momentum even though its predecessor was suppressed by the interaction. These findings may be relevant to the generation and maintenance of small-scale atmospheric vortexes such as tornadoes, waterspouts, and dust devils. Descriptors: 1. Atmospheric motion; 2. Thermals; 3. Fluid mechanics; 4. Convection; 5. Heat transfer; 6. Vertical velocity; 7. Atmospheric disturbance; 8. Experimentation.

01 ATMOSPHERIC SCIENCE (Cont.)

71-03-01-22

Woodley, William L.; Simpson, Joanne; Miller, Alan H.; MacKay, Steven; Williamson, Richard; and Cotton, Gerald F. "Some Results of Single Cloud Pyrotechnic Seeding in Florida, 1970". NOAA, Environmental Research Laboratories, Atlantic Oceanographic and Meteorological Laboratories, Miami, Fla. NOAA Technical Memorandum ERLTM-AOML 10. Nov. 1970. 106 pp. #1 COM-71-00184

A randomized single cloud pyrotechnic seeding experiment was conducted over South Florida on nine operating days in the spring and early summer of 1970. Five aircraft participated, one for seeding, photogrammetry and in-cloud measurements, one for in-cloud measurements near cloud base, one for midlevels, one for following top heights and occasional penetrations and one for dropsondes and high-level observations. Altogether 13 seeded clouds and 16 controls were obtained. This paper reports on the cloud growth and rainfall results of the program. The rainfall analyses were made with the University of Miami calibrated 10-cm radar, by the method developed and tested for the 1968 data. Significance is better than 5 percent for the whole cloud lifetimes for the 1970 data. Intraday comparisons were made comparing seeded and control clouds on the same day. This analysis increases seeded-control differences, which retain high significance. The possible inaccuracies in the radar-rainfall measurements are discussed, together with the analysis problems encountered. The operation on each day is discussed, and each GO cloud is described in connection with a photograph. Descriptors: 1. Cloud seeding; 2. Artificial precipitation; 3. Rainfall; 4. Meteorological radar; 5. Cloud physics; 6. Silver iodide.

71-03-01-23

Woodman, Ronald F. (Jicamarca Radar Observatory, Instituto Geofisico del Peru, Lima, Peru). "Vertical Drift Velocities and East-West Electric Fields at the Magnetic Equator". Journal of Geophysical Research, Space Physics, 75(31): 6249-6259, Nov. 1, 1970. ESSA Research Laboratories, Boulder, Colo., cooperative contract with the Instituto Geofisico del Peru.

Incoherent scatter observations of vertical drifts taken at Jicamarca (2° dip) are presented. Vertical drifts are found to be nearly constant as a function of height. These vertical drifts can also be taken as a direct measurement of the east-west electric fields at the magnetic equator. Their daily and seasonal behavior is presented. The effect of geomagnetic activity is discussed. Descriptors: 1. Measurements; 2. Electric fields; 3. Magnetic Equator; 4. Ionosphere; 5. Incoherent scatter technique.

71-03-01-24

World Meteorological Organization. "Catalogue of Meteorological Data for Research. Part II. Meteorological Stations With Observational Series Extending Over 80 Years or More". WMO Publication No. 174.TP.86. [1970]. Price \$7.00
WMO Publications Center, Division of UNIPUB, Inc., P.O. Box 433, New York, N.Y. 10016.

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Part II of the catalogue contains information on meteorological stations with observational series extending over 80 years or more. Information is listed by countries, in the alphabetical order of their English names. A report containing the lists was prepared on the basis of all participants at the Unesco/WMO Symposium on Changes of Climate (Rome, October 1961). Discussions on climatic fluctuations by the participants at the fourth session of CCI (Stockholm, August 1965) expressed the opinion that material collected in 1961 on stations in 50 countries was of permanent value. The Secretary-General was accordingly requested to revise the list of stations having observational series of 80 years or more and to publish it in the Catalogue of Meteorological Data for Research. Descriptors: 1. Climatology; 2. Meteorological data; 3. World-wide; 4. Meteorological stations.

71-03-01-24

World Meteorological Organization. "Proceedings of the WMO/IAMAP Symposium on Higher Education and Training (Rome, April 1970)". WMO Publication No. 278.TP.156. 1970. 322 pp. Price \$7.00. WMO Publications Center, Division of UNIPUB, Inc., P.O. Box 433, New York, N.Y. 10016.

The Symposium on Higher Education and Training was organized jointly by WMO and IAMAP. Its purpose was to review educational programmes and teaching practices and facilities for the training of Class I and Class II meteorological personnel as well as questions relating to the training of personnel for research work. The Symposium was attended by 65 persons from 30 countries, and a total of 36 papers were presented. These papers cover: Education and training of Class I meteorological personnel (university training); Education and training of Class II meteorological personnel (operational meteorologists); Training of research personnel; Training methods and facilities; General problems of meteorological education. This publication, which contains the full texts of all papers presented as well as a summary of the resulting discussions and the conclusions of the Symposium, will be of great interest to all engaged in meteorological education and training activities. The publication is available in English; a French translation will be available in the near future. Descriptors: 1. Symposia; 2. Education; 3. Training; 4. Teaching; 5. Meteorology; 6. Reviewing; 7. Evaluation; 8. World-wide.

71-03-01-25

World Meteorological Organization. "Technical Regulations. Volume II. Meteorological Service for International Air Navigation". WMO Publication No. 49.BD.3. 3d Edition, 1970. Price \$6.50. WMO Publication Center, Division of UNIPUB, Inc., Box 433, New York, N.Y. 10016.

The technical regulations presented are as follows: Part 1. Basic obligations for meteorological service for international air navigation. Part 2. Specifications for meteorological service for international air navigation.

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Part 3. Briefing and documentation practices. Part 4. Aeronautical climatological summaries and aeronautical descriptive climatological memoranda. Descriptors: 1. Regulations; 2. Meteorological service; 3. Air navigation (international); 4. Weather forecasting; 5. Meteorological charts; 6. Flight weather briefing.

71-03-01-26

World Meteorological Organization. "Twenty-Second Session of the Executive Committee, Geneva, 8-16 October 1970, Abridged Report With Resolutions". WMO Publication No. 277.RC.33. 1970. 253 pp. Price \$9.00. WMO Publications Center, Division of UNIPUB, Inc., P. O. Box 433, New York, N.Y. 10016.

The Executive Committee of the World Meteorological Organization held its 22d session in the headquarters of the Organization from 8-16 October 1970. The results of the session are summarized in this report. Descriptors: 1. Meetings; 2. Regulations; 3. Project management; 4. Budgeting; 5. Education; 6. Project planning; 7. Meteorology; 8. Hydrology; 9. Climatology; 10. Air pollution; 11. Observation network; 12. World-wide.

02 EARTH SCIENCES

71-03-02-01

UDC 528.063.9:681.14

Gulick, L. J. "A Comparison of Methods for Computing Gravitational Potential Derivatives". ESSA, Coast and Geodetic Survey, Rockville, Md. ESSA Technical Report C&GS 40. Sept. 1970. 36 pp. #1 COM-71-00185 #2 \$0.40

Computation of the derivatives of the gravitational potential of the earth using spherical harmonics requires the formation of a number of double sums. The expression of these double sums is the most important consideration for achievement of maximum efficiency. Three methods of computing the derivatives (subroutines given in Appendixes C, D, and E) are compared for efficiency, and it is found that the double sums are most efficiently computed using polar coordinates with subsequent transformation of the derivatives to rectangular coordinates by simple application of the chain rule. A subroutine using this method (Appendix C) uses less than 700 words of central memory and requires only 7.3 milliseconds for execution on the CDC 6600 computer when harmonic coefficients up to degree and order 14 are used. Expressions for the derivatives of polar coordinates with respect to rectangular coordinates and a derivation of the recursion formulas used in computing associated Legendre polynomials are also included as Appendixes A and B, respectively. Descriptors: 1. Mathematical programming; 2. Spherical harmonics; 3. Differential calculus; 4. Gravimetric geodesy; 5. Gravitational fields; 6. Computer programming; 7. Subroutines; 8. FORTRAN.

02 EARTH SCIENCES (Cont.)

71-03-02-02

Hasbrouck, W. P. "High Precision Profiling With a Rubidium Magnetometer Pair". NOAA, Environmental Research Laboratories, Earth Sciences Laboratories, Boulder, Colo. NOAA Technical Report ERL 192-ESL 14. Nov. 1970. 19 pp.

#1 COM-71-50003 #2 \$0.30

Reliable mapping of quasi-static total magnetic field changes to 0.1 gamma between stations separated by 1/2 km can be accomplished by use of a special paired rubidium magnetometer technique. This report discusses the limitations on profiling accuracy imposed by the intrinsic reproducibility of a rubidium horizontal gradiometer. It then describes a pier-differencing method of traversing which has been used to overcome this insufficiency and which has produced long-spaced station-to-station results of tenth gamma reliability. Nonlinear instrumental drift between the paired sensors is minimized by use of a differential drift correction. Examples show how this correction is computed and applied. Descriptors: 1. Magnetometers; 2. Rubidium magnetometers; 3. Magnetic measurement; 4. Magnetic fields; 5. Magnetic surveys; 6. Measuring instruments; 7. Sensor characteristics; 8. Geomagnetism.

71-03-02-03

Koch, Karl-Rudolf. (ESSA, Coast and Geodetic Survey, Geodetic Research and Development Laboratory, Rockville, Md.). "Surface Density Values for the Earth From Satellite and Gravity Observations". Geophysical Journal, Royal Astronomical Society, 21(1):1-12, Oct. 1970. #1 COM-71-00229

The representation of the Earth's gravity field as the potential of a simple layer distributed over the surface of the Earth is determined by combining satellite observations and gravity anomalies. Density values of the simple layer for 192 surface elements are computed and converted into harmonic coefficients up to the 15th degree and order. These coefficients are used to determine surface density values referred to a reference ellipsoid with the flattening of an earth in hydrostatic equilibrium. The geophysical implications of these values are outlined. Descriptors: 1. Gravitational fields; 2. Observed gravity; 3. Gravity anomalies; 4. Reference ellipsoid; 5. Geoids; 6. Hydrostatics; 7. Density measurements; 8. Geodetic satellites.

71-03-02-04

Nason, Robert D., and Tocher, Don. (ESSA, Earthquake Mechanism Laboratory, San Francisco, Calif.). "Measurement of Movement on the San Andreas Fault". (In: L. Mansinha et al. (eds.), Earthquake Displacement Fields and the Rotation of the Earth, D. Reidel Publishing Co., Dordrecht-Holland, 1970:246-254).

#1 COM-71-00222

The San Andreas fault is a major earthquake source in California. Its geologic history indicates continuing displacement at about 1.2 cm/yr over the past 25 million years, which is less than the estimates in current theories of

02 EARTH SCIENCES (Cont.)

global plate tectonics. Current movement on the fault is by fault displacements in earthquakes and by gradual fault creep slippage not directly related to earthquakes. Fault slippage in the historic period 1848 to 1968 has been equivalent to about 2.5 cm/yr average fault displacement. Descriptors: 1. Geological faults; 2. Dislocations (materials); 3. Earthquakes; 4. Geological folds; 5. Geodetic surveys; 6. Tectonics; 7. Geophysics; 8. Seismology; 9. Physical geography; 10. California.

03 ENVIRONMENTAL SYSTEMS

71-03-03-01

Glahn, Harry R. (ESSA, Weather Bureau, Techniques Development Laboratory, Silver Spring, Md.). "Computer-Produced Worded Forecasts". Bulletin of the American Meteorological Society, 51(12):1126-1131, Dec. 1970. #1 PB-194 262

Examples of worded weather forecasts prepared entirely by computer are presented. Forecasts of the individual elements are produced objectively with input from the Primitive Equation and Subsynoptic Advection models used operationally at the ESSA Weather Bureau's National Meteorological Center. Possibilities for the use of automated worded forecasts are discussed. Descriptors: 1. Weather forecasting; 2. Numerical analysis; 3. Computers; 4. Translator routines; 5. Synoptic meteorology; 6. Automation.

71-03-03-02

Haslett, J. C.; Wasmundt, D. F.; McGill, L. R.; Adams, G. W.; and Taylor, J.H. (all, Space Disturbances Laboratory); Thompson, T. L., and Whipple, E. C. (both, Aeronomy Laboratory). "Instrumentation of Small Rockets for Polar Cap Absorption Studies". NOAA, Environmental Research Laboratories, Space Disturbances Laboratory, Boulder, Colo. NOAA Technical Report ERL 190-SDL 19. Dec. 1970. 32 pp. #1 COM-71-50002 #2 \$0.35

The instrumentation of small sounding rockets for scientific experiments in the region from 50 km to approximately 110 km is described. These particular rockets were developed to measure the diurnal variations of proton spectra and electron densities during solar proton events. Seven rockets were flown with each carrying a three-channel proton spectrometer and a three-frequency Faraday rotation experiment. The proton spectrometer and Faraday rotation experiment are discussed in some detail. Because of difficulties experienced with the telemetry, considerable telemetry development had to be done. Although the telemetry was developed specifically for these rockets, it is of general interest and is described. In particular the report mentions modifications of the rocket antenna system, the voltage controlled oscillators, and the modification of a parametric amplifier for use with the Ft. Churchill range telemetry. Block diagram and photographs are included in the text, while detailed schematics of the pertinent electronics are included in an appendix.

03 ENVIRONMENTAL SYSTEMS (Cont.)

71-03-03-03

Johnson, David S. (ESSA, National Environmental Satellite Center, Suitland, Md.). "Global Atmospheric Research Program". Astronautics and Aeronautics. Oct. 1970. pp. 28-32. #1 COM-71-00224

A review of the historical needs and events which led to the formation of a Global Atmospheric Research Program (GARP). The broad outline of GARP is discussed, and the salient features of the program are described. Descriptors: 1. Artificial satellites; 2. Orbits; 3. Meteorological satellites; 4. Weather intelligence; 5. Earth atmosphere.

71-03-03-04

Sargent, Howard H. III, and Klemperer, W. K. (both, ESSA Research Laboratories, Boulder, Colo.). "A Decametric Long Baseline Interferometer System". Radio Science, 5(10):1283-1286, Oct. 1970. #1 COM-71-00227

A relatively simple long baseline interferometer (LBI) system, which uses analog tape recorders, is described; it operates at decametric wavelength (26.3 MHz). A base station at Boulder with an array of 76 full-wave dipoles is used in conjunction with a small, readily portable antenna of 16 full-wave dipoles that can be set up at various outlying field sites by two men in less than 3 hours. Commercial rubidium clocks are employed for timing and for local oscillator signals at each station. Tapes are aligned and data are correlated by an analog multiplier after each run at the base station. The use of pseudo-random code generators which can be reset and started on a given clock pulse at each station greatly simplifies tape alignment and system calibration. Descriptors: 1. Radio astronomy; 2. Antenna arrays; 3. Radio interferometers; 4. Scatter propagation; 5. Wavelengths; 6. Interferometers; 7. Dipole antennas; 8. Starlight; 9. Analog systems; 10. Ionospheric propagation.

71-03-03-05

Shinners, Willard W. (ESSA Research Laboratories, Atlantic Oceanographic and Meteorological Laboratories, Miami, Fla.). "Status of Instrument Development for Specialized Marine Observations". Meteorological Monographs, 11(33): Oct. 1970. #1 COM-71-00212

A number of representative data acquisition systems are presented under three general categories: 1. shipboard, 2. airborne, and 3. buoys. The Research Triangle Institute developed a system aboard the research vessel EASTWARD using both analog strip chart and digital tape recording of up to 24 channels of meteorological and oceanographic data. To overcome problems inherent in operating from a large ship, Florida State University successfully used an extensible boom extending forward from the bow of the ESSA DISCOVERER. To obtain time series and profile data within the gradient level. ESSA's Sea-Air Interaction Laboratory uses a five-channel multiplexing system. Resistance-controlled oscillators modulate IRIG channels 5-9 on a 403-MHz carrier frequency. The University of Hamburg uses three modulated audio frequencies in their three-channel sonde on the 403-MHz carrier frequency to acquire data at sea. Bead

03 ENVIRONMENTAL SYSTEMS (Cont.)

thermistors, carbon humidity strips, aneroid cells and lightweight anemometers are used. For data at the ocean-atmosphere interface the TRITON buoy developed at Florida State University has performed successfully while moored in water depths of 8,000 ft. A spar buoy configuration 112 ft in length is placed in 75 ft below the surface. On-board recording and radio telemetry of data may be programmed. A much smaller spar buoy, 40 ft in length and 300 lb in weight, has been operated from the DISCOVERER as a tethered system while the ship is hove to. A hard wire link is used for data collection. Descriptors: 1. Data acquisition; 2. Data recording; 3. Meteorological data; 4. Oceanographic ships; 5. Buoys; 6. Booms (equipment); 7. Air-water interactions; 8. EASTWARD vessel; 9. DISCOVERER vessel.

71-03-03-06

Slutz, Ralph J.; Doeker, Robert B.; Gray, Thomas B., Jr.; Grubb, Richard N.; Hornback, Charles E.; Schiffmacher, Edward R. (all, Space Disturbances Laboratory) Sugar, George R. (Aeronomy Laboratory); and Winkelman, James R. (Space Disturbances Laboratory). "A Satellite Recording and Data Base System". NOAA, Environmental Research Laboratories, Boulder, Colo. NOAA Technical Memorandum ERL SDL-16. Dec. 1970. 20 pp. #1 COM-71-00220

A coherent plan to augment the present data system at the Space Disturbances Laboratory is outlined. The real time capability of the system is discussed along with satellite monitoring, system reliability, and other salient features. Tables of costs and schedule are included. Descriptors: 1. Artificial satellites; 2. Telemetry; 3. Real time operations; 4. Data acquisition; 5. Data retrieval; 6. Data transmission; 7. Information systems.

04 HYDROLOGY AND LIMNOLOGY

71-03-04-01

UDC 556.1:551.579:551.573(7-11)"1958/1963"

Rasmusson, Eugene M. (ESSA, Geophysical Fluid Dynamics Laboratory, Princeton, N.J.). "A Study of the Hydrology of Eastern North America Using Atmospheric Vapor Flux Data". Monthly Weather Review, 99(2):119-135, Feb. 1971. #2 \$0.63.

The atmospheric water vapor flux divergence and certain aspects of the water balance of Eastern North America are investigated, using data from the period May 1, 1958, to Apr. 30, 1963. Mean monthly values of evapotranspiration and storage change are computed as residuals, using measured values of vapor flux divergence, precipitation, and streamflow. Computations are performed for regions varying in size from $42 \times 10^5 \text{ km}^2$. The results for the smaller areas, which are the least reliable, are critically examined. Computed values of evapotranspiration and storage change are compared with the climatological estimates of Thornthwaite associates and Budyko. The Thornthwaite climatic water balance data appear to overestimate $P - E$, the difference between precipitation and evapotranspiration, during winter and underestimate it during

04 HYDROLOGY AND LIMNOLOGY (Cont.)

summer, Budyko's values of evapotranspiration generally show a slightly smaller seasonal variation and appear to lead the values obtained from the atmospheric budget computations by around 0.5 to 1 mo. Flux divergence computations are made for the Gulf of Mexico and Caribbean Sea, and the results are compared with values obtained by Hastenrath and with estimates of $E - P$ by Wust and Budyko. Interannual variations in storage over the Eastern Region of North America are examined and are found to be comparable with the seasonal changes. The onset of the drought of the early and mid-1960s is clearly reflected in the computed storage values. It is found that variation in mean monthly precipitation during winter is positively correlated with the strength of the northward flow of moisture across the Gulf Coast, but little or no relationship between these quantities appears to exist during summer. Descriptors:

1. Evapotranspiration; 2. Hydrologic cycle; 3. Water vapor flux; 4. Atmospheric circulation; 5. Droughts; 6. Water balance equations; 7. Eastern North America.

71-03-04-02

UDC 551.577.37:551.515.2:556.166.4(755)"1969.08.19-20"Camille

Schwarz, Francis K. (ESSA, Weather Bureau, Office of Hydrology, Silver Spring, Md.). "The Unprecedented Rains in Virginia Associated With the Remnants of Hurricane Camille". Monthly Weather Review, 98(11):851-859, Nov. 1970.

#2 \$0.65.

The rainfall and synoptic features of the unprecedented Virginia storm associated with the remnants of hurricane Camille are analyzed. Comparisons with alltime record-breaking rains in the United States and probable maximum precipitation estimates are made. The rains of this storm are shown to come within 80 to 85 percent of the probable maximum precipitation for a duration of 12 hr for areas up to 1,000 mi². Persistent low-level moisture feeding into the remains of Camille's cyclonic circulation was found to be close to the maximum persisting value for the season and location. The passage of the remnant low-pressure system a little to the south of the rain area resulted in low-level flow from the southeast which made it possible to utilize the high moisture, with some orographic intensification, without depletion by upwind barriers. Apparently, in addition to the very high moisture values, a number of synoptic and mesoscale weather factors operated properly to produce the remarkable rainfall. Descriptors: 1. Hurricanes; 2. Rainfall; 3. Mountains; 4. Physical geography.

05 MARINE BIOLOGY AND FISHERIES

71-03-05-01

Anas, Raymond E. (Bureau of Commercial Fisheries, Marine Mammal Biological Laboratory, Seattle, Wash.). "Accuracy in Assigning Ages to Fur Seals". Journal of Wildlife Management, 34(4):844-852, Oct. 1970. #1 COM-71-00225

05 MARINE BIOLOGY AND FISHERIES

Ages of seals (Callorhinus ursinus) killed annually for their furs on the Pribilof Islands, Alaska, are determined from samples of whole and sectioned upper canine teeth. Sectioned teeth, however, were used only in 1968 and only for females 7 years old and older. Tests of the percentage errors showed significant differences ($P < 0.01$) in mean squares for the ages-types of tooth preparation interaction and readers for females in ages 3 to 7, the readers and ages for females in ages 7 to 11, and the readers-types of tooth preparation-ages interaction mean square for males in ages 2 to 5 years. Whole teeth were superior to sectioned teeth for assigning ages to females in ages 3 to 7. Whole teeth and sectioned teeth were about equally useful for assigning ages to males in ages 2 to 5. The four readers had common pooled errors for whole teeth of 3- to 7-year old females (13.4 percent). Three of the four readers had common pooled errors for sectioned teeth of 7- to 11-year old females (48.6 percent). One reader differed significantly from the other readers for sectioned teeth, but the remaining reader errors were common for whole and sectioned teeth of 2- to 5-year old males (8.0 percent). Adjusted errors of -3.44, +1.37, and +3.35 percent (overall error of 2.54 percent) were computed for females killed since 1956 in ages 3, 4, and 5, respectively, and adjusted errors of +15.98, -1.60, +0.28, and +2.21 percent (overall error of 1.93 percent) were computed for males killed since 1956 in ages 2, 3, 4, and 5, respectively, on the Pribilof Islands. The estimated error for age 6 females killed since 1956 was +6.52 percent. The kills of females 7 years old and older were not adjusted. Descriptors: 1. Aquatic mammals; 2. Seals (mammals); 3. Aging (biology); 4. Age determination; 5. Teeth; 6. Alaska.

71-03-05-02

Cooper, Richard A., and Uzmann, Joseph R. (both, Bureau of Commercial Fisheries, Biological Laboratory, West Boothbay Harbor, Maine). "Migrations and Growth of Deep-Sea Lobsters, Homarus americanus". Science, 191(3968):288-290, 22 Jan. 1971

In distinct contrast to the restricted movements of coastal stocks of lobsters (Homarus americanus), those inhabiting the outer continental shelf undertake extensive seasonal migrations. Of 5710 tagged lobsters released on the outer continental shelf off New England from April 1968 to June 1969, 400 had been recaptured by April 1970. The distribution of the recoveries demonstrated shoalward migration in spring and summer and a return to the edge of the shelf in fall and winter. Deep-sea lobsters have a faster rate of growth than coastal lobsters; growth increments at molting and the frequency of molting are greater. Descriptors: 1. Lobsters; 2. Migrations; 3. Marking; 4. New England.

71-03-05-03

Fujino, Kazuo. (Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii). "Skipjack Tuna Subpopulation Identified by Genetic Characteristics in the Western Pacific". (In: John C. Marr (Editor), The Kuroshio: A Symposium on the Japan Current. Honolulu, Hawaii, East-West Center Press, 1970. pp. 385-393.) #1 COM-71-00199

05 MARINE BIOLOGY AND FISHERIES

As a part of the Pacificwide studies of the population structure of the skipjack tuna (Katsuwonus pelamis), more than 2,500 blood specimens have been collected from areas off the northeastern coast of Japan, Okinawa, and the Mariana and Palau Islands in the western Pacific Ocean. Comparison of genetic compositions of the blood group and serum group systems for the specimens of different areas indicated that 1. no significant heterogeneity was seen in all the genetic systems used within the western Pacific, and 2. gene frequencies of the serum esterase system of the samples from the western Pacific are significantly different from those of the central Pacific (Hawaii and Line Islands) and the eastern Pacific (Baja California). On the basis of these observations as well as other available biological information, the skipjack tuna population structure in the western Pacific is discussed. Descriptors: 1. Blood serum; 2. Blood analysis; 3. Genetics; 4. Tunas; 4. Marine biology; 5. Population migrations.

71-03-05-04

Hitz, Charles R. (Bureau of Commercial Fisheries, Exploratory Fishing and Gear Research Base, Seattle, Wash.). "Vessels in the U.S. Pacific Coast Shrimp Fisheries". Presented at: The Federal Provincial Atlantic Fisheries Committee. Conference on Canadian Shrimp Fishery, St. John, N.B., Canada, Oct. 27-29, 1970. 24 pp. #1 COM-71-00215

There are three groups of shrimp vessels operating in the U.S. Pacific shrimp fisheries. Most of them are of the Pacific combination type, and are defined by the fishing gear they employ. Otter trawls are used to capture pink shrimp (Pandalus jordani and P. borealis) along the coast of the Pacific Northwest and in the Gulf of Alaska from vessels called shrimp trawlers. In southeastern Alaska the beam trawl is also used to take pink shrimp, and the vessels are called beam trawlers. The larger spot shrimp (P. platyceras) and side-stripe shrimp (Pandalopsis dispar) are fished with pots from vessels called "shrimpers." The shrimp trawler dominates the Pacific coast shrimp fisheries with some 68 vessels operating along the Pacific Northwest and 20 in Alaska. The greater bulk of the shrimp catch is landed in Alaska by these combination vessels. Some of them land as much as 3 million pounds per year. Descriptors: 1. Shrimp. 2. Fisheries; 3. Harvesting; 4. Ships (fishing vessels); 5. Design criteria; 6. Equipment (fishing gear).

71-03-05-05

Judy, Mayo H., and Dudley, Donnie L. (both, NOAA, Estuarine and Menhaden Research Center, Beaufort, N.C.). "Movements of Tagged Blue Crabs in North Carolina Waters". U.S. Fish and Wildlife Service, Commercial Fisheries Review, Reprint No. 892:29-35, Nov. 1970.

The infrequent exchange of crabs between estuarine systems or between wide-spread coastal areas shows that a commercial fishery for blue crabs in one area cannot depend on migration of commercial-size crabs from another area. From 1957 to 1965, 17,237 female and 5,691 male adult blue crabs were tagged and released in North Carolina waters, including two rivers, two sounds, and two ocean areas.

05 MARINE BIOLOGY AND FISHERIES (Cont.)

Total recoveries were 6,947 tags, or 30.3 percent. Most recoveries (90-95 percent) were made within 6 months--and 60-65 percent of these were recaptured within 3 months after release. Of crabs caught away from tagging sites, 83 percent of females and 80 percent of males were caught within 24 km of release areas. Females moved from estuaries into high-salinity waters in warm weather and returned to estuaries in late fall and winter. Males displayed limited movement between estuary and ocean but generally remained in estuaries. Descriptors: 1. Crabs; 2. North Carolina; 3. Shellfish; 4. Crustacea; 5. Estuaries; 6. Salt water; 7. Animal migrations.

71-03-05-06

Jurkovich, Jerry E. (Bureau of Commercial Fisheries, Exploratory Fishing and Gear Research Base, Seattle, Wash.). "Shrimp-Fish Separator Trawls With a Method of Modifying a Gulf of Mexico Shrimp Trawl for Use in Waters off the States of Oregon and Washington". (In: The Federal-Provincial Atlantic Fisheries Committee. Conference on Canadian Shrimp Fishery. St. John, N.B., Canada, Oct. 27-29, 1970. 15 pp.) #1 COM-71-00186

This paper tells how to modify a 57-foot Gulf of Mexico semiballoon trawl so that while being towed, it will separate fish from ocean pink shrimp (Pandalus jordani) catches. This separator trawl is now used in the shrimp fishery off the states of Oregon and Washington. An alternate separator trawl diagram is included in the event there is no 57-foot Gulf trawl to modify. A brief history of the use of separator trawls is also provided. Descriptors: 1. Fisheries; 2. Fishing; 3. Shrimps; 4. Harvesting; 5. Separators; 6. Ships (fishing vessels); 7. Design criteria; 8. Oregon Coast; 9. Washington Coast.

71-03-05-07

Nakamura, Eugene L. (Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii). "Symposium of Biological Data on Hawaiian Species of Stolephorus". (In: John C. Marr (ed.), The Kuroshio: A Symposium on the Japan Current. Honolulu, Hawaii, East-West Center Press, 1970. pp. 425-446.) #1 COM-71-00193

Data on identity, distribution, bionomics and life history, population, and exploitation of the nehu (Stolephorus purpureus) are summarized. The nehu, an engraulid fish, is used as live bait in the fishery for skipjack tuna (Katsuwonus pelamis) in Hawaii. Data on the identity and distribution of the roundhead (Stolephorus buccaneeri), a second Hawaiian engraulid, are also summarized. The taxonomic status of the roundhead has been questioned, since morphological intermediates between it and the nehu have been found. Descriptors: 1. Marine fish; 2. Taxonomy; 3. Life cycle; 4. Morphology; 5. Demography; 6. Fertility.

71-03-05-08

NOAA, National Marine Fisheries Service, Seattle, Wash. Commercial Fisheries Abstracts, 24(1):1-40, Jan. 1971 *1

05 MARINE BIOLOGY AND FISHERIES (Cont.)

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution. *Commercial Fisheries Abstracts* contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology. Descriptors: 1. Fisheries; 2. Acquisitions; 3. Fishing grounds; 4. Marine biology; 5. Fish farming.

71-03-05-09

Otsu, Tamio. (Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii). "Tagging of Skipjack Tuna, Katsuwonus pelamis, in Palau". (In: John C. Marr (ed.), The Kuroshio: A Symposium on the Japan Current. Honolulu, Hawaii, East-West Center Press, 1970. pp. 565-568.) #1 COM-71-00192

The Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, initiated a skipjack tuna tagging program in the Palau Islands, Western Carolines, in June 1967 in cooperation with the Government of the Trust Territory of the Pacific Islands. As of mid-March 1968 five tagged fish have been recovered. Descriptors: 1. Tuna; 2. Marking; 3. Fishing grounds; 4. Migrations; 5. Fishing;

71-03-05-10

Pristas, Paul J. (National Marine Fisheries Service, Center for Estuarine and Menhaden Research, Beaufort, N.C.). "BCF Scientists Tag and Recover Menhaden". Commercial Fisheries Review, Reprint No. 884. Aug.-Sept. 1970. *1

Over 1,066,000 Atlantic menhaden, Brevoortia tyrannus, were tagged internally with ferrometallic tags, 1966-69. Tags were recovered on magnets in reduction plants during the production of fish meal and oil. More than 200,000 tagged fish have been recaptured. In 1969, 35,000 Gulf menhaden, Brevoortia patronus, were tagged and nearly 7,000 were recaptured. From these returns, movements can be determined and mortality rates can be estimated. Descriptors: 1. Atlantic menhaden; 2. Brevoortia tyrannus; 3. Gulf menhaden; 4. Brevoortia patronus; 5. Fish tagging; 6. Migration; 7. Mortality.

71-03-05-11

Wilkins, E. Peter H. (Bureau of Commercial Fisheries, Center for Estuarine and Menhaden Research, Beaufort, N.C.). "Occurrence of a Juvenile Fourbeard Rockling, Enchelyopus cimbrius, in the Coastal Estuarine Waters of North Carolina". Chesapeake Science, 11(3):197-198, Sept. 1970. #1 COM-71-00234

A juvenile four-bearded rockling was captured in an estuary 3 miles from the ocean. The species usually occurs in oceanic waters over the Continental Shelf. Descriptors: 1. Marine fishes; 2. Minnows; 3. Ecology; 4. Animal behavior.

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